

CLAIMS

What is claimed is:

1. A speech recognition system comprising:
a conversion circuit operative to convert a speech waveform into a digital pulse waveform; and
an analysis system that analyzes one or more characteristics of the digital pulse waveform to determine a spoken word corresponding to the speech waveform from a set of selectable words, the analysis system operative to adjust a threshold level corresponding to converting the speech waveform into a digital pulse waveform to analyze portions of the speech waveform at different amplitude levels.
2. The system of claim 1, the conversion circuit comprising a comparator that receives the speech waveform and compares the speech waveform to the threshold level provided by a threshold level shifter circuit.
3. The system of claim 2, the threshold level shifter circuit operative to change the threshold level based on a state of a single digital output.
4. The system of claim 2, the threshold level shifter circuit operative to modify a threshold level of the comparator at one or more threshold levels.
5. The system of claim 2, the threshold level shifter circuit operative to change between three threshold levels based on a state of a single digital output having a high impedance state, a low digital state and a high digital state.
6. The system of claim 2, the threshold level shifter circuit operative to change between three threshold levels based on a state of two digital signals.

7. The system of claim 1, further comprising a microphone that converts a spoken word into an electrical signal and an amplifier that amplifies the electrical signal into a speech waveform having one or more characteristics at distinguishable levels, the amplifier coupled to the comparator.

8. The system of claim 1, the one or more characteristics being at least one of speech waveform modulation amplitude, speech waveform modulation frequency and speech waveform duration.

9. The system of claim 1, the analysis system comprising a microcontroller programmed to analyze one or more characteristics of the digital pulse waveform and compare the one or more characteristics to stored characteristics associated with a set of words to determine the spoken word from the set of words.

10. The system of claim 1, the analysis system comprising a control logic component operative to analyze one or more characteristics of the digital pulse waveform and compare the one or more characteristics to stored characteristics associated with a set of words to determine the spoken word from the set of words.

11. A system for distinguishing between spoken words, the system comprising:

an amplifier that amplifies an electrical signal corresponding to a spoken word and provides a speech waveform having one or more characteristics at distinguishable levels;

a comparator that converts the speech waveform into a digital pulse waveform based on comparing the speech waveform to a threshold level; and

a threshold level shifter circuit that provides a voltage corresponding to the threshold level, the threshold level shifter circuit operative to provide two or more different threshold levels based on an input state of the threshold level shifter circuit.

12. The system of claim 11, the threshold level shifter circuit operative to change the threshold level based on a state of a single digital signal.

13. The system of claim 11, the threshold level shifter circuit operative to modify the threshold level of the comparator at one or more threshold levels.

14. The system of claim 11, the threshold level shifter circuit operative to change three threshold levels based on a state of a single digital output having a high impedance state, a low digital state and a high digital state.

15. The system of claim 11, the threshold level shifter circuit operative to change between three threshold levels based on a state of two digital signals.

16. The system of claim 11, further comprising a microcontroller programmed to analyze one or more characteristics of the digital pulse waveform and compare the one or more characteristics to stored word profiles associated with a set of words to determine the spoken word from the set of words.

17. The system of claim 11, further comprising a microcontroller programmed to change the state of the threshold level circuit so that different portions of a speech waveform having different amplitudes can be converted to a digital pulse waveform for analysis of the one or more characteristics.

18. The system of claim 17, the different portions comprising voiced portions and unvoiced portions.

19. The system of claim 17, the microcontroller being programmed to determine between a word having a voiced portion and an unvoiced portion and a word having a voiced portion only.

20. The system of claim 19, the microcontroller being programmed to detect receipt of a voiced portion of a speech waveform, change the threshold level of the comparator through the threshold level circuit upon detecting receipt of a voiced portion and determine receipt of an unvoiced portion.

21. The system of claim 20, the voiced portion being detected by monitoring amplitude and frequency of the speech waveform and the unvoiced portion being detected by monitoring frequency of the speech waveform.

22. The system of claim 11 being one of an electronic toy, an educational aid, an entertainment product and a communication system.

23. A speech recognition system comprising:
means for transforming a spoken word into a speech waveform;
means for converting the speech waveform into a digital pulse waveform; and
means for shifting a threshold level associated with converting the speech waveform into a digital pulse waveform.

24. The system of claim 23, further comprising means for analyzing one or more characteristics of the digital pulse waveform and determining the spoken word from a subset of selectable spoken words.

25. A method for distinguishing a spoken word between a set of selectable words, the method comprising:
transforming a spoken word into a speech waveform;
converting the speech waveform into a digital pulse waveform based on a threshold level;
determining one or more characteristics associated with the digital pulse waveform; and

matching the determined one or more characteristics associated with the digital pulse waveform to one or more stored characteristics associated with a set of selectable words to determine the spoken word.

26. The method of claim 25, further comprising adjusting the threshold level so that one or more characteristics of a different portion of the speech waveform can be determined.

27. The method of claim 25, the one or more characteristics being at least one of speech waveform modulation amplitude, speech waveform modulation frequency and speech waveform duration.

28. The method of claim 25, the determining one or more characteristics associated with the digital pulse waveform comprising counting the number of pulses of the digital pulse waveform to determine the frequency of at least a portion of the speech waveform.

29. The method of claim 25, the determining one or more characteristics associated with the digital pulse waveform comprising determining the time between pulses of the digital pulse waveform to determine the frequency of at least a portion of the speech waveform.

30. The method of claim 25, the determining one or more characteristics associated with the digital pulse waveform comprising monitoring the frequency of the pulses of the digital pulse waveform to determine if a voiced portion of a speech waveform has been detected, changing the threshold level upon detecting receipt of a voiced portion to monitor for an unvoiced portion of a speech waveform and determining if an unvoiced portion of a speech waveform has been received by monitoring the frequency of the pulses of the digital pulse waveform at the changed threshold level.

31. The method of claim 30, further comprising determining if the speech waveform corresponds to one of a word having a voiced portion and an unvoiced portion and a word having a voiced portion only.

32. The method of claim 25, the one or more stored characteristics associated with a set of selectable words comprising one or more stored word profiles.

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